

Factors associated with vaccine type pneumococcal carriage in children under 2 years of age in a rural population in Pakistan

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Introduction

Pneumococcal carriage is a prerequisite for disease with children being the main reservoir and transmitters. ^{1,2} Here, we look at factors associated with Vaccine type (VT) carriage in children under 2 years of age in a rural population in Pakistan.

Methodology

Children were enrolled and nasopharyngeal swabs collected using standard WHO guidelines. Serotyping was done using CDC standardized Multiplex PCR. The serotypes were classified as vaccine type (VT) and non-vaccine type (NVT) based on their inclusion in the ten valent vaccine (PCV10).

Results

From 2014-2018, 3140 children were enrolled. Factors negatively associated with VT carriage were: primary education of 1 to 5 years (aOR 0.7, 95%CI 0.5-0.9), history of difficulty in breathing (aOR 0.7, 95%CI 0.6-0.9), exposure to smoke (aOR 0.8, 95% CI 0.6-0.9), child fully immunized (aOR 0.7, 95%CI 0.5-0.9) and being enrolled in 3rd (aOR 0.6, 95%CI 0.4-0.8) and 4th year of study (aOR 0.6, 95%CI 0.5-0.9) whereas history of runny nose was positively associated (aOR 1.6, 95% CI 1.2-1.9).

Conclusion

Various socio-demographic and clinical factors were associated with VT carriage. A child having received all three doses of PCV10 significantly reduced the odds of carrying a VT serotype.

References

1.

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	PCV 10 negative		PCV 10 positive		Adjusted Model	
	N	(%)	N	(%)	OR (95% CI)	aOR (95% CI)
N	2761		379			
Age group(months)						
0-11 months	1679	88	229	12	Ref	
12-23 months	1082	87.8	150	12.2	0.1 (0.8 - 1.3)	
Gender						
Male	1394	50.5	186	49.1	Ref	
Female	1367	49.5	193	50.9	1 (0.8 - 1.3)	
Primary care taker's education						
no education	2281	82.6	315	83.1	Ref	
1-5 years	307	11.1	44	11.6	1 (0.7 - 1.5)	
6-16 years	173	6.3	20	5.3	0.8 (0.5 - 1.3)	
Primary wage earner's education						
no education	1454	52.7	217	57.3	Ref	Ref
1-5 years	686	24.9	75	19.8	0.7 (0.6 - 1)	0.7 (0.6 - 1)
6-16 years	621	22.5	87	23.0	0.9 (0.7 - 1.2)	1 (0.8 - 1.3)
Total people in household, median (IQR)	8	6-11	8	6-11	1.0 (0.9-1.0)	
No. of rooms in house	1	1-2	1	1-2	0.9(0.8-1.1)	
Crowding Index	6	4-7	6	4-7.5	1.0(0.9-1.1)	
Symptoms (in last 2 weeks) *						
Runny nose	1364	50.6	220	59.3	1.4 (1.1 - 1.8)	1.5 (1.2 - 1.9)
Cough	1046	38.8	174	46.9	1.4 (1.1 - 1.7)	
Fever	1284	47.6	179	48.3	1 (0.8 - 1.3)	
Fast breathing	65	2.4	14	3.8	1.6 (0.9 - 2.9)	
Difficulty in breathing	548	20.3	64	17.3	0.8 (0.6 - 1.1)	0.7 (0.5 - 1)
Lower Chest indrawing	61	2.3	13	3.5	1.6 (0.9 - 2.9)	
Temperature						
Hypothermia	9	0.3	2	0.5	Ref	
Normal temperature	2523	93.6	347	93.5	0.6 (0.1 - 2.9)	
Hyperthermia	165	6.1	22	5.9	0.6 (0.1 - 3)	
Tachypnea	182	6.8	31	8.4	1.3 (0.8 - 1.9)	
Lower chest indrawing	61	2.3	13	3.5	1.6 (0.9 - 2.9)	
Hospitalization in past 12 months or since birth						
No	2678	97.0	368	97.1	Ref	
Yes	83	3.0	11	2.9	1 (0.5 - 1.8)	
Outpatient visits in past one month						
Zero visit	1424	51.6	187	49.3	Ref	
one visit	703	25.5	94	24.8	1 (0.8 - 1.3)	
two or more	634	23.0	98	25.9	1.2 (0.9 - 1.5)	
Exposure to Environmental Tobacco Smoke	993	36.0	123	32.5	0.9 (0.7 - 1.1)	0.8 (0.6 - 1)
Cooking Fuel						
Natural gas	431	15.6	54	14.3	Ref	
Wood/paper/straw/crop residue/animal dung	2317	83.9	323	85.2	1.1 (0.8 - 1.5)	
Other	13	0.5	2	0.5	1.2 (0.3 - 5.6)	
Child exposed to smoke (less than 2 m)	1493	54.1	196	51.7	0.9 (0.7 - 1.1)	
Vaccination status *						
Unvaccinated	1129	40.9	198	52.2	Ref	
Vaccinated	1630	59.0	180	47.5	0.6 (0.5 - 0.8)	
No of PCV 10 doses						
Zero	501	18.2	87	23.0	Ref	Ref
One	289	10.5	61	16.1	1.2 (0.8 - 1.7)	1.3 (0.9 - 1.9)
Two	339	12.3	50	13.2	0.8 (0.6 - 1.2)	1 (0.7 - 1.4)
Three	1630	59.1	180	47.6	0.6 (0.5 - 0.8)	0.7 (0.5 - 1)
Time						
2014/15	647	23.4	124	32.7	Ref	Ref
2015/16	678	24.6	102	26.9	0.8 (0.6 - 1)	0.8 (0.6 - 1)
2016/17	704	25.5	75	19.8	0.6 (0.4 - 0.8)	0.6 (0.4 - 0.8)
2017/18	732	26.5	78	20.6	0.6 (0.4 - 0.8)	0.6 (0.5 - 0.9)